

REMARKS

I. Introduction

Claims 1-4, 6, 7, 11-13, 15-17, 20, 21, 23-25 and 27-32 are currently pending in this application.

The pending claims were rejected under 35 U.S.C. § 103(a). Applicants respectfully request reconsideration and request that for the following reasons the rejections should be withdrawn, the application allowed, and the case passed to issue.

II. Claims Rejections Under 35 U.S.C. § 103(a)

A. Akiyama in view of Brors and Kobayashi

Claims 1, 24, 27, 28, 31 and 32 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Akiyama JP 2000-057640 in view of Brors U.S. Patent No. 4,169,031 and Kobayashi JP 56-152963. Applicants respectfully traverse the rejection.

Claims 1 and 24 each recite in pertinent part a configuration in which, “the annular-shaped magnetron magnet assemblies have progressively increasing diameters, and a distance between each sputtering surface and the at least one substrate/workpiece is *progressively larger*.”

Similarly, claim 13 recites a method “wherein each annular-shaped magnetron magnet assembly has at least one progressively increasing diameter and a distance between each sputtering surface and the at least one substrate/workpiece is *progressively larger*.”

Furthermore, such a configuration in which the “distance between each sputtering surface and the at least one substrate/workpiece is *progressively larger*,” would not be obvious to a person having ordinary skill in the art, at least because, this configuration achieves unexpectedly improved results. As explained in the instant specification, arranging the device such that a distance between each sputtering surface and the at least one substrate/workpiece is

progressively larger, has the unexpected effect of creating a steeply inclined sputtered film profile, followed by a less steeply inclined sputtered film thickness and then an inverted steeply inclined sputtered film thickness. In this manner the sub-layers *collectively* form a substantially uniform thickness. See specification at page 16 line 23 to page 17, line 15.

In order to establish a *prima facie* obviousness rejection under 35 U.S.C. § 103(a), evidence must be provided that there would be an obvious benefit in making the asserted modifications. See *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1744 (2007). Further, “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR*, 127 S. Ct. at 1741 (citing *In re Kahn*, 441 F. 3d 977, 988 (Fed. Cir. 2006)). At a minimum, the cited prior art does not disclose (expressly or inherently) that the annular-shaped magnetron magnet assemblies have progressively increasing diameters, and a distance between each sputtering surface and the at least one substrate/workpiece is *progressively larger*.

The Examiner concedes at page 5 of the office action mailed April 24, 2009 that Akiyama fails to disclose the shape of the annular magnetron assemblies or a distance between each sputtering surface and the at least one substrate is progressively larger, as recited in claims 1 and 24 and claim 13. Therefore, the Examiner relies on Brors and Kobayashi for allegedly ameliorating these deficiencies. Specifically, the Examiner asserts that Kobayashi allegedly teaches “changing the distance between the substrate and electrode in order to form more uniform films.”

It is well established that, if a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation

to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

As an initial matter, Akiyama not only does not teach or suggest a configuration in which “a distance between each sputtering surface and the at least one substrate/workpiece is progressively larger,” as recited in claims 1, 13, and 24; Akiyama teaches away from any such configuration. Akiyama states in Para. [0026] of the computer translation:

In addition, distance between the targets 14 and substrates 16 in **each** membrane formation room was set to 70 mm (*emphasis added*).

As such, rather than teach or suggest any variation of distances between each sputtering surface and the substrate, Akiyama **requires** that these distances be fixed.

Furthermore, Brors also teaches away from any variation in the distances between each sputtering surface and the substrate. As Brors teaches clamping the cathode disc 24 via a clamping ring 22 to sputter deposit an electrically insulative material. See Brors col. 4, lines 36-48. Thus, the distance between each sputtering surface and the substrate is constant.

Furthermore, although Kobayashi speculates on changing various parameters of a sputtering device based on the desired ratio of the films, Kobayashi does not teach or suggest a configuration in which “a distance between each sputtering surface and the at least one substrate/workpiece is *progressively larger*.”

In response to Applicants arguments filed February 4, 2009, the Examiner argues that Kobayashi teaches changing the distance between the target and substrate, and that the distance can be selected as either larger or smaller to optimize film uniformity, (see page 13 of office action mailed April 24, 2009). Furthermore, the Examiner acknowledges that Akiyama teaches setting the distance between substrate/workpieces but asserts, that based on Kobayashi, it would be obvious to change the distances. Applicants respectfully submit, that none of the cited prior

art references teach or suggest that the distance between each sputtering surface and the at least one substrate/workpiece is *progressively larger*. Rather, the machine translation of Kobayashi states that “by changing the size of the electrodes, the **distance** between the substrate and each electrode, sputtering time, electric power, etc. Thus, the total thickness of the deposited films on the substrate can be made uniform over a wide range.” As is clear from the above excerpted translation, Kobayashi does not teach varying the *distances* so that the distances are progressively larger, as claimed, but rather speculates that the distance between the substrate and electrode may be changed. This is not the same as teaching different distances between each set of sputtering surface and substrate/workpiece, let alone teaching these distances are progressively larger.

Moreover, there is no teaching or suggestion in Kobayashi to modify the distances in the manner claimed. Indeed the only teaching of configuring the distance between each sputtering surface and the at least one substrate/workpiece to be *progressively larger*, is in Applicants disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must not be based on Appellants’ disclosure. *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The Examiner has apparently relied on improper hindsight reasoning in reaching the conclusion of obviousness.

Therefore, it is respectfully submitted that neither Akiyama, Brors, nor Kobayashi, either alone or in combination do not disclose the same cathode sputter apparatus as recited in claims 1, 13 and 24.

Furthermore, a person having ordinary skill the art would not have combined these references at least because Akiyama and Brors *teach away* from varying the distance between each sputtering surface and the substrate as discussed above.

Accordingly, it is respectfully requested that the rejection be withdrawn and claims 1, 13 and 24 be allowed.

Furthermore, claims 2-4, 6, 7, 11-12, 15-17, 20, 21, 23, 25 and 27-32 depend from and further define the subject matter of claims 1, 13 and 24 respectively and therefore should also be allowed.

B. Akiyama in view of Brors and Hedgcoth and Kobayashi

Claims 1-4, 6, 7, 11, 13, 15-17, 20, 24, 25, 27, 28., 29, 30, 31 and 32 were rejected under 35 U.C. § 103(a) as allegedly being unpatentable over Akiyama in view of Brors and further in view of Hedgcoth U.S. Patent No. 4,894,133 and Kobayashi. Applicants respectfully traverse the rejection.

As discussed above, in reference to the rejection under 35 U.S.C. § 103(a) as allegedly being unpatentable over Akiyama in view of Brors and Kobayashi, claims 1 and 24 each recite in pertinent part a configuration in which, “the annular-shaped magnetron magnet assemblies have progressively increasing diameters, and a distance between each sputtering surface and the at least one substrate/workpiece is progressively larger.”

Similarly, claim 13 recites a method “wherein each annular-shaped magnetron magnet assembly has at least one progressively increasing diameter and a distance between each sputtering surface and the at least one substrate/workpiece is progressively larger.” At a minimum, neither Akiyama, Brors nor Kobayashi, either alone or combination, teach these features as recited in the present claims 1, 13 and 24 for at least the reasons discussed above.

In fact, a person having ordinary skill in the art would not have found it obvious to combine the teaching of Akiyama and Brors, which require that the distances between each

sputtering device and the substrate be at the same fixed distance, with the disclosure of Kobayashi.

The Examiner at pages 8 and 9 of the office action mailed April 24, 2009 alleges that Hedgcoth teaches several features which are recited in the claims. However, at a minimum, it is clear that Hedgcoth does not teach or suggest “a distance between each sputtering surface and the at least one substrate/workpiece is *progressively larger*,” as recited in claims 1, 13 and 24.

Rather, Figs. 1 and 2 of Hedgcoth show a group of cathode/target assemblies in which the distance between the sputtering surface of each cathode/target assembly and the substrate remains *constant*. The target source to substrate distance is preferably maintained within a range of 2 to 4 inches. Hedgcoth states in col. 4, lines 55-56:

The target dimensions are approximately the same as the nucleating targets 42 (emphasis added).

Thus, Hedgcoth fails to disclose or suggest, at a minimum, a distance between *each* sputtering surface and the at least one substrate/workpiece is *progressively larger*, as required by claims 1, 13 and 24.

Further, contrary to the Examiner’s assertion, Hedgcoth does not discuss depositing a *perpendicular* magnetic recording medium on a magnetically soft underlayer. Hedgcoth describes a cobalt/nickel alloy source, not a *perpendicular* magnetic recording medium in the section cited by the Examiner. Hedgcoth fails to disclose or remotely suggest, at a minimum, transporting at least one substrate for a perpendicular magnetic recording medium, as required in independent claim 13. Thus, Hedgcoth fails to cure the deficiencies of Akiyama and Brors and Kobayashi.

Moreover, the Examiner at page 14 of the office action mailed April 24, 2009, responds to Applicants previous arguments that Hedgcoth fails to teach or suggest, at a minimum,

transporting at least one substrate for a perpendicular magnetic recording medium, as required in independent claim 1, by conceding that Hedgcoth does not disclose deposition on a soft magnetic layer. Therefore, the Examiner references Nasu for this alleged teaching. However, Nasu is not referenced in rejected the claims.

Thus, Hedgcoth fails to cure the deficiencies of Akiyama, Brors and Kobayashi.

Accordingly, claims 1, 13 and 24 are allowable over the cited prior art references, and therefore should be allowed.

Furthermore, claims 2-4, 6, 7, 11-12, 15-17, 20, 21, 23, 25 and 27-32 depend from and further define the subject matter of claims 1, 13 and 24 respectively and therefore should also be allowed

C. Akiyama in view of Brors and further in view of Hedgcoth and Kobayashi and further in view of Mukai.

Claims 12 and 21 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Akiyama in view of Brors and further in view of Hedgcoth and Kobayashi and further in view of Mukai U.S. Patent No. 5,441,615. Applicants respectfully disagree.

As discussed above, in reference to the rejection under 35 U.S.C. § 103(a) as allegedly being unpatentable over Akiyama in view of Brors and Hedgcoth and Kobayashi, claim 1 recites in pertinent part a configuration in which, “the annular-shaped magnetron magnet assemblies have progressively increasing diameters, and a distance between each sputtering surface and the at least one substrate/workpiece is progressively larger.”

Similarly, claim 13 recites a method “wherein each annular-shaped magnetron magnet assembly has at least one progressively increasing diameter and a distance between each sputtering surface and the at least one substrate/workpiece is progressively larger.” At a

minimum, neither Akiyama, Brors, Hedgcoth, nor Kobayashi, either alone or combination, teach these features as recited in the present claims 1 and 13. In fact, a person having ordinary skill in the art would not have found it obvious to combine the teaching of Akiyama or Brors or Hedgcoth, which require that the distances between each sputtering device and the substrate be at the same fixed distance, with the disclosure of Kobayashi.

The Examiner at page 10 of the Office Action dated April 24, 2009 concedes that none of Akiyama, Brors, Hedgcoth, or Kobayashi teach the use of shield members, as recited in claim 12 and 21, and therefore relies on Mukai for this alleged disclosure.

However, at a minimum, Mukai fails to cure the deficiencies of Akiyama, Brors, Hedgcoth and Kobayashi, at least because, Mukai fails to teach or suggest “a distance between *each* sputtering surface and the at least one substrate/workpiece is *progressively larger*,” as required by claims 1 and 13.

Thus, Mukai fails to cure the deficiencies of Akiyama and Brors and Hedgcoth and Kobayashi.

Accordingly, claims 1 and 13 are allowable over the cited prior art references, and therefore should be allowed.

Furthermore, claims 12 and 21 depend from and further define the subject matter of claims 1 and 13 respectively and therefore should also be allowed.

D. Akiyama in view of Brors and further in view of Hedgcoth and further in view of Nasu

Claim 23 was rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Akiyama in view of Brors and further in view of Hedgcoth and further in view of Nasu U.S. Patent No. 5,326,637. Applicants respectfully disagree with the rejection.

As discussed above, in reference to the rejection under 35 U.S.C. § 103(a) as allegedly being unpatentable over Akiyama in view of Brors and Hedgcoth and Kobayashi, claim 13 recites a method “wherein each annular-shaped magnetron magnet assembly has at least one progressively increasing diameter and a distance between each sputtering surface and the at least one substrate/workpiece is progressively larger.”

At a minimum, neither Akiyama, Brors, Hedgcoth, nor Kobayashi, either alone or combination, teach these features as recited in the present claim 13.

In fact, Examiner acknowledges that Akiyama teaches setting the distance between substrate/workpieces but asserts, that based on Kobayashi, it would be obvious to change the distances. Applicants respectfully submit, that none of the cited prior art references teach or suggest that the distance between each sputtering surface and the at least one substrate/workpiece is *progressively larger*. Rather, the machine translation of Kobayashi states that “by changing the size of the electrodes, the **distance** between the substrate and each electrode, sputtering time, electric power, etc. Thus, the total thickness of the deposited films on the substrate can be made uniform over a wide range.” As is clear from the above excerpted translation, Kobayashi does not teach varying progressively larger *distances* as claimed, but rather speculates that the distance between the substrate and electrode may be changed, not that there are different distances between each set of sputtering surface and substrate/workpiece, let alone that the distances are progressively larger.

Indeed, it is respectfully submitted that a person having ordinary skill in the art would not have found it obvious to combine the teaching of Akiyama or Brors or Hedgcoth with the disclosure of Kobayashi because each of Akiyama, Brors and Hedgcoth teach away from changing the distances between each sputtering device and the substrate.

The Examiner at page 11 asserts that Nasu teaches a magnetic soft under layer can be Fe, Fe-Co.

However, at a minimum, Nasu fails to cure the deficiencies of Akiyama, Brors, Hedgcoth and Kobayashi, at least because, Nasu also fails to teach or suggest “a distance between *each* sputtering surface and the at least one substrate/workpiece is *progressively larger*,” as required by claims 1, 13 and 24.

In contrast, to the above excerpted claim feature, Nasu fails to disclose such a configuration.

Thus, Nasu fails to cure the deficiencies of Akiyama, Brors, Hedgcoth, and Kobayashi.

Accordingly, claim 13 is allowable over the cited prior art references, and therefore should be allowed.

Furthermore, claim 23 depends from and further define the subject matter of claim 13 and therefore should also be allowed.

III. Conclusion

In view of the above amendments and remarks, Applicants respectfully submit that this application should be allowed and the case passed to issue. If there are any questions regarding this response or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

10/776,203

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP



Aamer S. Ahmed

Registration No. 58,958

600 13th Street, N.W.
Washington, DC 20005-3096
Phone: 202.756.8000 ASA:MWE
Facsimile: 202.756.8087
Date: August 24, 2009

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